

REMARKS

Introductory Comments

In the November 6, 2002 Office Action, Examiner Garcia-Otero objected to the declaration, drawings and specification, and rejected all of the pending claims 1-37. By this Amendment, claims 7 and 19-23 are cancelled without prejudice or disclaimer of the subject matter recited therein. After this Amendment, claims 1-6, 8-18, and 24-37 are pending.

Objection to the Declaration (Office Action, paragraphs 17-18)

Applicants acknowledge and agree with the Examiner's selection of Lindner as the first joint inventor.

Objection to the Drawings (Office Action, paragraphs 20-21)

The Examiner has observed that the measuring apparatus of Fig. 2 is designated by reference character "26" while the measuring apparatus of Fig. 3 is designated as "42". Applicants submit that such different designations are proper, because the measuring apparatus shown in Fig. 2 is a schematic diagram of a measuring apparatus generally, while Fig. 3 illustrates one particular example of a measuring apparatus used in connection with the invention. (See Applicants' specification, page 3, first paragraph). The measuring apparatus 26 of Fig. 2 is a schematic representation of any suitable measuring apparatus (for example, a sensor, actor, valve, pump, etc.). (See Applicants' specification, page 3, second paragraph). The example measuring apparatus 42 shown in Fig. 3 is, specifically, an apparatus for measuring the level of material in vessel 36. (See Applicants' specification, page 5, first paragraph). Thus, measuring apparatus 42 is one particular example of a measuring apparatus 26. For these reasons, Applicants respectfully request that the objection to the drawings be withdrawn.

Objection to the Specification (Office Action, paragraphs 22-23)

The cited portion of the specification has been corrected in response to the Examiner's objection. No new matter is believed to have been added by this correction. Accordingly, Applicant respectfully requests that the objections to the specification be withdrawn.

Rejection of Claims 1, 2, 3, 5, 7, and 8 Under 35 U.S.C. 112, first and second paragraphs (Office Action, paragraphs 24-36)

The Examiner rejected claims 1, 2, 3, 5, 7, and 8 under 35 U.S.C. § 112, first and second paragraphs, as containing subject matter not described in the specification in such a way as to enable one skilled in the art to make or use the invention, and as failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Applicants respectfully traverse these rejections for the reasons set forth below.

With respect to claim 1, the Examiner contends that the terms “sequence programs” and “comprehensive mimic image” are not adequately described or defined. (Office Action, paragraphs 27-29).

Claim 1 particularly recites an apparatus in which a “software apparatus model” is memorized “which contains a comprehensive mimic image of said apparatus including its parameters, functionality and sequence programs.” Thus, in accordance with generally accepted rules of English grammar, as claimed, the “software apparatus model” includes a “comprehensive mimic image of said apparatus,” and the “comprehensive mimic image” includes “parameters, functionality and sequence programs” of said apparatus.

The specification explains that the apparatus model contains “all information relevant to the apparatus, i.e. all parameters, apparatus functionality as well as the programs and sequence specification contained in the apparatus. Each apparatus model is thus a comprehensive mimic image of the apparatus.” (Applicants’ specification, page 3, second paragraph). Based on this disclosure, one of ordinary skill in the art would understand that an important feature of the claimed software apparatus model is that it contains **all** information relevant to the apparatus; in other words, it contains a comprehensive mimic image of the apparatus.

The term “comprehensive mimic image” is therefore used to describe the fact that the software model contains a **complete representation** of the apparatus. This is reflected in the use of the words “comprehensive,” “mimic”, and “image,” the ordinary meanings of which are consistent with the description provided in the specification.

The term “comprehensive mimic image” is used to indicate that the claimed software apparatus model is different from prior art apparatus specifications, which are not **complete** representations of the apparatus. As the specification explains, “[i]t is currently usual to prepare a specification for each apparatus...to inform it as to the functionality and parameters of the apparatus. However, this specification is **incomplete** and **not suitable to provide** the central

control unit with a **comprehensive mimic image** of the apparatus concerned.” (See Applicants’ specification, page 1, paragraph 2) (emphasis added). A disadvantage of such prior art “incomplete apparatus specifications” is that they do not allow the apparatus to be tested without it actually being on-line. (See Applicants’ specification, page 1, paragraph 2) (emphasis added).

What is claimed is a software apparatus model which contains a complete representation of the apparatus, not an incomplete representation of the apparatus. If a limitation appears in the specification but is not recited in the claim, it is **not** read in to the claim. (See MPEP § 2106 at 2100-09 (citing In re Prater, 415 F.2d. 1393) (Fed. Cir. 1989) (emphasis added)). Thus, claim 1 **does not** require that the software apparatus **only** contain the comprehensive mimic image, or that the comprehensive mimic image **only** contain “parameters, functionality and sequence programs.” All that is required by claim 1 is that the software apparatus model includes a complete representation of the apparatus, including “parameters, functionality, and sequence programs” of the apparatus.

As recited in claim 1, the claimed comprehensive mimic image includes “parameters, functionality and sequence programs” of the apparatus. For the reasons that follow, one of ordinary skill in the art would be able to determine the meaning of “sequence programs” based on a reading of the specification as a whole.

The specification explains that “nowadays, complex processes and **process sequences**, e.g., in operating a large industrial plant are automated.” (Applicants’ specification, page 1, second paragraph) (emphasis added). The apparatus model 28...can be loaded into the central control unit 18 which...simulates the behaviour of the measuring apparatus 26 on the basis of the apparatus model 28, it thereby simulating **the total sequence** from measurement signal receival via processing of the measurement signal up to output of the measured value.” (Applicants’ specification, page 4, first paragraph) (emphasis added). “In regular operation of the measuring apparatus processing the measurement signal is done...with respect to the parameters and functionalities in the processor thereof by **programs and/or sequence definitions** being processed.” (Applicants’ specification, page 4, first paragraph) (emphasis added). Thus, reading the specification as a whole, one of ordinary skill would understand that “sequence programs” are related to the stages of operation of the measuring apparatus, and are needed to provide a complete specification of the measuring apparatus in order to simulate the behavior of the measuring apparatus in operation.

As shown in Fig. 2, for example, the stages of operation of measuring apparatus 26 include an input stage 30, a processor 32, and an output stage 34. At input stage 30, the measuring apparatus receives a measurement signal. The measurement signal is processed in processor 32. An output signal or digital data is output via output stage 34. Parameters and limit values are taken into account by processor 32 in processing the measurement signal. (See Applicants' specification, page 4, first paragraph). Accordingly, one of ordinary skill in the art would understand that simulation of the processing of the measurement signal by the measuring apparatus is done by the so-called "sequence programs."

With respect to dependent claims 2, 3, and 13, such claims are amended to overcome the Examiner's rejections under 35 U.S.C. 112, paragraphs 1 and 2, and not to narrow the scope of the claims.

With respect to dependent claims 5, 16, 17, and 18, the specification states that "in the control unit a software program is provided with the aid of which in using the loaded apparatus models the operation of the plant can be simulated." (Applicants' specification, page 2, paragraph 3). "The method in accordance with the invention is characterized by it comprising the steps of loading apparatus models...into the central control unit and simulating the operation of the plant...by means of a software program sequenced in the control unit." (Applicants' specification, page 2, paragraph 4). Thus, the claimed "software program" is provided in the control unit, and executes or accesses the apparatus models that are loaded in the control unit in order to simulate a plant's operation. Nothing in the specification limits the claimed "software program" to being either a "low level" program or a "high level" program. It is not necessary to so limit the term, as suggested by the Examiner (Office Action, paragraph 34), because one of ordinary skill in the art would understand that the "software program" may be implemented either as a low level or a high level program. Such choice is a design choice that depends on a variety of factors related to a particular implementation of the present invention. Accordingly, the Examiner's rejection of these claims under 25 U.S.C. 112 is improper.

Claims 7 and 19-23 are cancelled without prejudice or disclaimer of the subject matter recited therein.

With respect to claims 8 and 24-29, Applicants submit that, consistent with the ordinary meanings of the terms "data" and "carrier", one of ordinary skill in the art would understand that a "data carrier" is something on which an apparatus model can be memorized. As explained in the specification, it is possible to "memorize these apparatus models on data carriers which are

loaded into the central control unit 18 from the data carrier.” (Applicants’ specification, page 5, second paragraph). Accordingly, one of ordinary skill in the art would understand that the claimed data carrier is something that can be used to load an apparatus model into the central control unit 18, instead of, for example, storing the apparatus model in the corresponding apparatus. (See Applicants’ specification, page 5, third paragraph).

Response to Examiner’s Comments on Claim Interpretation (Office Action, paragraphs 37-44)

Claims 1-37 have been amended to delete all of the reference characters, in order to clarify that such reference characters are not intended to limit the scope of the claims.

The Examiner is to give claims “their broadest reasonable interpretation in light of the supporting disclosure.” Manual of Patent Examination Procedure, 8th Ed. Aug. 2001 [“MPEP”], § 2106 at 2100-9 (citing *In re Morris*, 127 F.3d 1048 (Fed. Cir. 1997)). **“If an applicant does not define a term in the specification, that term will be given its ‘common meaning’”**. MPEP § 2106 at 2100-8 (citing *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994)) (emphasis added). Accordingly, Applicants respectfully traverse the Examiner’s interpretations of claim terms generally to the extent that any portion of such interpretation is contrary to or inconsistent with the controlling statutes, rules, procedures, and case law, and further respectfully traverse all express or implied definitions of claim terms supplied by the Examiner to the extent that such definitions are more limiting than or inconsistent with the common, ordinary meaning of the claim terms or an express definition of such terms in the specification (if any).

In particular, Applicants respectfully traverse the Examiner’s interpretation of the term, “memorized,” as set forth in paragraph 41 of the Office Action, as improper, because the definition of such term offered by the Examiner does not appear anywhere in Applicants’ specification. The term “memorized” is not expressly defined in the specification, and is therefore to be interpreted in accordance with its ordinary meaning.

Further, Applicants respectfully traverse the Examiner’s interpretation of claim 8, as set forth in paragraph 43, as improper, because “portable memory” is a term provided by the Examiner, not by Applicants’ specification. As explained above, the specification provides that a “data carrier” is something on which apparatus models can be memorized to be loaded into the central control unit 18. (See Applicants’ specification, page 5, second paragraph). The specification does not anywhere state that the data carrier is required to be “portable memory.”

Rejection of Claims 1-37 Under 35 U.S.C. § 103(a) (Office Action, paragraphs 45-84)

In the November 6, 2002 Office Action, claims 1-37 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Banks in view of Tabak and Tucker (as identified in paragraphs 6-8 of the Office Action). The Examiner contends that “it would have been obvious...to use Tabak and Tucker to modify Banks.” (Office Action, paragraph 59).

The Examiner’s rejections are improper because the cited references, whether taken alone or in combination, do not disclose, teach, or suggest all of the limitations of claim 1. None of Banks, Tabak, and Tucker, whether alone or taken together, disclose, teach, or suggest “an apparatus...characterized in that **in said apparatus** a software apparatus model is memorized **which contains a comprehensive mimic image of said apparatus**” as particularly recited in independent claim 1.

First, none of the cited references disclose, teach, or suggest the claimed software apparatus model, which includes a comprehensive mimic image of the apparatus. As discussed above, the comprehensive mimic image includes a **complete** representation of the apparatus.

Banks is a textbook reference that teaches simulation concepts and principles for designing simulation models. Banks does not teach any practical applications of such concepts and principles involving industrial processes where apparatuses (such as sensors, etc.) are provided with software apparatus models.

In fact, Banks specifically teaches away from the claimed comprehensive mimic image because Banks does not teach providing a complete representation of an apparatus in a software apparatus model. At page 6, Section 1.3.1, Banks discusses the need to select limits or boundaries of a model. “The model should be complex enough to answer the questions raised, but not too complex.” (Banks, page 6, paragraph 6). “A discrete-event model attempts to represent the components of a system and their interactions **to such an extent** that the objectives of the study are met.” (Banks, page 6, paragraph 6) (emphasis added). “[A] model builder **must decide on the elements of the system to include** in the model.” (Banks, page 8, first paragraph). “**Only those components that could cause significant differences** in decision making...**need to be considered.**” (Banks, page 8, paragraph 6).

Further, under 35 U.S.C. § 103(a), a claimed invention is unpatentable only if the differences between the invention and the prior art “are such that the subject matter **as a whole** would have been obvious at the time the invention was made to a person having ordinary skill in the art.” 35 U.S.C. § 103(a); see Graham v. John Deere Co., 383 U.S. 1, 14, 148 USPQ 459, 465

(1966) (prescribes a framework for nonobviousness analysis) (emphasis added).

The “determination of obviousness can not be based on the hindsight combination of components selectively culled from the prior art to fit the parameters of the patented invention. There must be a teaching or suggestion within the prior art, or within the general knowledge of a person of ordinary skill in the field of the invention, to look to particular sources of information, to select particular elements, and to combine them in the way they were combined by the inventor.” ATD Corp. v. Lydall Inc., 48 USPQ2d 1321, 1329 (Fed. Cir. 1998) (emphasis added).

In this case, the Examiner clearly used impermissible hindsight to pick and choose certain components of the three cited references based on Applicants’ disclosure, without considering each of those references as a whole and without considering Applicants’ claims as a whole.

Tabak, and Tucker are textbook references that teach technical concepts and theories relating to microprocessors and data structures, respectively. Tabak and Tucker provide teachings at the conceptual level. For example, Fig. 4.1 of Tabak shows a conceptual design of a memory hierarchy. Neither Tabak nor Tucker teach any practical applications relating to the control of an apparatus in an industrial process.

Tabak is a textbook on “Advanced Microprocessors.” The portion of Tabak cited by the Examiner relates specifically to memory hierarchy in microprocessors. (See Tabak, page 43). Tabak teaches multiple levels of memory hierarchy on microprocessors. “Five notable levels of the memory hierarchy...that can be found on a number of recent microprocessors, are illustrated in Fig. 4.1.” (Tabak, page 43, first paragraph). Tabak does not mention at all industrial processes involving apparatuses such as sensors, etc., which are connected to a central control unit. Tabak contains no teachings relating to software apparatus models for such apparatuses. Tabak does not contemplate building a “comprehensive mimic image” of such an apparatus, because Tabak is not even concerned with such an apparatus or industrial process.

Similarly, Tucker is a “Computer Science and Engineering Handbook.” The cited portions of Tucker relate to data structures, one type of which is called a “sequence.” Tucker does not mention at all industrial processes involving apparatuses such as sensors, etc., which are connected to a central control unit. Tucker contains no teachings related to software apparatus models for such apparatuses. Tucker does not contemplate a “comprehensive mimic image” for such an apparatus, because Tucker is not even concerned with such an apparatus or industrial process.

With regard to the Examiner's comments at paragraphs 83-84 of the Office Action, Applicants respectfully wish to clarify that what is meant by such comments is that claims 12-37 do not contain limitations not already discussed in the preceding paragraphs of the Office Action; **not** that such claims are further rejected because they do not contain any limitations in addition to the limitations recited in the claims from which they depend. Applicants believe that all of dependent claims 2-6, 8-18, and 24-37 contain limitations in addition to those recited in independent claim 1, and are therefore also patentable over the prior art of record.

Final Remarks

Claims 1-6, 8-18, and 24-37 of the above-noted application are believed to be in condition for allowance. Applicants respectfully request that the Examiner so find and issue a Notice of Allowance in due course. The Examiner is asked to call Applicant's attorneys, James A. Coles, at 317-684-5282, or Christine Orich, at 317-684-5414, to address any outstanding issues in order to expedite the prosecution of this application for all parties.

If necessary, Applicants request that this Amendment be considered a request for an extension of time for a time appropriate for the response to be timely filed. Applicants request that any required fees needed beyond those submitted with this Amendment be charged to the account of Bose McKinney & Evans LLP, Deposit Account Number 02-3223.

Respectfully submitted,

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